REMARKS/ARGUMENTS

Claims 1, 4, 7, 10, 42, 43 and 46-50 have been amended and claims 2, 8, 9, 44 and 45 have been cancelled without prejudice. Claims 1, 3-7, 10-22, 24-28, 30-43 and 46-50 remain in this application. Applicant believes that the present application is in condition for allowance, and respectfully requests reconsideration of the rejection in light of the remarks set forth below.

Independent claims 1 and 7 have been amended to incorporate the subject matter of cancelled claims 2 and 8, respectively. Independent claims 42, 43 and 50 have also been amended to incorporate subject matter similar to that in cancelled claim 2. No new matter has been added.

The claims in the Office Action do not appear to reflect the Examiner's Amendments dated October 1, 2008 and October 7, 2008. For example, in the Examiner's Amendment dated October 7, 2008, claim 43 was amended from "computer-readable media" to "computer-readable storage medium." However, page 2 of the Office Action refers to claim 43 as reciting "[a] computer-readable medium." Therefore, Applicants have assumed that the Examiner's Amendments dated October 1, 2008 and October 7, 2008 has been withdrawn.

Claim Rejections – 35 USC § 101

Claims 43-49 were rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

While not acquiescing to the properness of the rejection, claims 43 and 49 have been amended to expedite prosecution to recite "[a] computer-readable storage medium storing instructions for determining receive diversity in a receiver of a communication system." Applicants submit that a computer-readable storage medium storing instructions for determining receive diversity constitutes patentable subject matter. Therefore, Applicants respectfully request that the § 101 rejection of claims 43-49 be withdrawn.

Claim Rejections – 35 USC § 112

Claims 42-49 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 42 has been amended to recite "a receiver" in line 4 to provide antecedent basis for "receiver." Therefore, Applicants respectfully request that the § 112 rejection of claim 42 be withdrawn.

While not acquiescing to the properness of the rejection, claims 43 has been amended to expedite prosecution to recite "[a] computer-readable storage medium storing instructions for determining receive diversity in a receiver of a communication system." This amendment makes clear that the computer-readable storage medium stores instructions. Therefore, Applicants respectfully request that the § 112 rejection of claims 43-49 be withdrawn.

Claim Rejections – 35 USC § 103

Claims 1, 7, 42-43 and 50 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Gustafsson et al. (U.S. 7,024,168) (hereinafter "Gustafsson") in view of Yano et al (U.S. 6,615,386) (hereinafter "Yano"). Claims 2-4, 8-10 and 44-46 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Gustafsson in view of Yano and in further view of Rich (U.S. 5,940,452) (hereinafter "Rich"). Claims 14-22, 24-25, 27 and 30-41 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Rich in view of Willey (U.S. 6,505,058) (hereinafter "Willey") and further in view of Gustafsson.

Claim 1 is directed to an apparatus for use in a communication system. The apparatus comprises a receiver, including a plurality of receiver chains adapted for processing in the receiver, for receiving a pilot channel and determining a channel condition of the pilot channel. The apparatus further comprises a control system for controlling receive diversity and power consumption of the receiver by selecting a number of the plurality of receiver chains based on the determined channel condition, wherein the control system is configured for reducing the number of selected receiver chains when the determined channel condition is above a first channel condition threshold. None of the applied references, taken alone or in combination, teach or suggest the apparatus of claim 1 for at least the reasons set forth below.

Gustafsson discloses a receiver comprising a first RF processor 420 and a second RF processor 422, in which the receiver uses both the first and second RF processors 420 and 422 to receive an RF signal when receive diversity is turned on and only uses the first RF processor 420 when diversity is turned off. See col. 5, lines 37-46 of Gustafsson. Gustafsson also discloses

that the receiver can decide whether to use diversity based on current radio performance. See col. 4, lines 5-6.

Yano discloses an error correcting apparatus in a receiver that using repetition processing to process received signals. See Abstract of Yano. Yano also discloses a Dedicated Physical Control Channel (DPCCH) received by the receiver, in which a slot of the DPCCH includes a PILOT that is ultilized when the reception side measures a signal interference ratio (SIR). See col. 3, lines 1-10 and Figure 15.

Neither Gustafsson nor Yano, taken alone or in combination, teaches at least the feature of the control system reducing the number of selected receiver chains when the determined channel condition is above a first channel condition threshold. Recognizing that Gustafsson and Yano fail to disclose the above feature, the Office Action relied on Rich to overcome deficiencies of Gustafsson and Yano. However, contrary to the Office Action, Rich does not overcome the deficiencies of Gustafsson and Yano for at least the reasons set forth below.

Rich discloses a radio system 100 comprising a first antenna 114, a second antenna 116, a receiver 126 common to both antennas 114 and 116 and a controller 108. See Figure 1 of Rich. The radio system 100 operates in one of the three selected states, in which the first antenna 114, the second antenna 116 or both antennas are coupled to the common receiver 126. See col. 11, lines 10-17. The controller 108 selects one of the three selected states in response to a ratio of Ec/Io. Figure 6 of Rich shows a flowchart for selecting among the three selected states. At step 602, the antennas are placed in a first selected state. At step 606, a determination is made whether a ratio Ec/Io is above a predetermined threshold. See Figure 6 and col. 20, lines 52-54. If the ratio Ec/Io is above the predetermined threshold, then the antennas stay in the first selected state at step 607. See col. 20, lines 58-60. Thus, the number of antennas coupled to the common receiver stays the same when the ratio Ec/Io is above the predetermined threshold. The same is true for steps 614 and 621 in Figure 6. Maintaining the same number of antennas coupled to a common receiver when a ratio Ec/Io is above the predetermined threshold is contrary to reducing a number of selected receiver chains when a determined channel condition is above a first channel condition threshold, as recited in claim 1. Thus, Rich would actually lead one skilled in the art away from a control system that is configured for reducing the number of selected receiver chains when the determined channel condition is above a first channel condition threshold.

For at least the reasons given above, Applicants submit that claim 1 is patentable over the applied references, and respectfully request that the rejection of claim 1 be withdrawn.

Independent claims 7, 42, 43, and 50 are also patentable for at least the reasons given above for claim 1.

Independent claim 14 is directed to a method in a communication system for decoding a quick paging channel (QPCH). The method comprises determining a channel condition of a pilot channel received at a mobile station in the communication system and determining receive diversity at a receiver of the mobile station by determining a number of a plurality of receiver chains of the receiver for receive diversity based on the determined channel condition. The method further comprises determining a first data bit of the QPCH received at the mobile station in accordance with processing of one or more signals produced based on the determined receive diversity, wherein power consumption of the receiver is controlled based on the receive diversity. None of the applied references, taken alone or in combination, teach or suggest the method of claim 14 for at least the reasons set forth below.

The method of claim 14 enhances the amount of power that is saved when using a QPCH by determining the first data bit of the QPCH received at the mobile in accordance with processing of one or more signals produced based on the determined receive diversity, wherein power consumption of the receiver is controlled based on the receive diversity. This is because an erroneously decoded QPCH bit can cause the receiver to erroneously wake up for a paging signal that is not present, resulting in a huge amount of wasted power. The determined receive diversity reduces decoding error for the first data bit of the QPCH by using a number of receiver chains to receive the first data bit of the QPCH when needed based on the determined channel conditions. The reduction in the amount of power wasted by erroneous QPCH decoding offsets the additional power needed for receive diversity resulting in an overall reduction in power. Thus, the method of claim 1 enhances the power savings of QPCH. None of the applied references, taken alone or in combination, teach or suggest such a method for enhancing the power savings of QPCH.

Rich discloses coupling a first antenna 114, a second antenna 116 or both antennas to a common receiver based on a ratio of Ec/Io. See col. 11, lines 10-17.

Gustafsson discloses a receiver comprising a first RF processor 420 and a second RF processor 422, in which the receiver uses both the first and second RF processors 420 and 422 to

receive an RF signal when receive diversity is turned on and only uses the first RF processor 420 when diversity is turned off. See col. 5, lines 37-46 of Gustafsson. Gustafsson also discloses that the receiver can decide whether to use diversity based on current radio performance. See col. 4, lines 5-6. Gustafsson also discloses that the receiver receives and demodulates a portion of the RF signal before determining whether to use receive diversity. According to the flowchart in FIG. 5 of Gustafsson, the receiver receives the RF signal in step 514 and demodulates the RF signal 517 before determining whether to use diversity for the RF signal in step 521.

Neither Rich nor Gustafsson, taken alone or in combination, teaches at least the feature of determining a first data bit of the QPCH received at the mobile station in accordance with processing of one or more signals produced based on the determined receive diversity, wherein power consumption of the receiver is controlled based on the receive diversity. Recognizing that Rich and Gustafsson fail to disclose the above feature, the Office Action relied on Willey to overcome the deficiencies of Rich and Gustafsson.

Willey discloses a method for determining whether to wake up a mobile station, in which a base station transmits a QPCH paging indicator bit to the mobile station indicating whether the mobile station is to wake up to receive a page. See col. 5, lines 48-50 of Willey.

Applicants submit that it would not have been obvious to combine Gustafsson with Willey to arrive at the feature of determining a first data bit of the QPCH received at the mobile station in accordance with processing of one or more signals produced based on the determined receive diversity, wherein power consumption of the receiver is controlled based on the receive diversity, for at least the reasons below.

The receiver of Gustafsson needs to receive and demodulate a portion of the RF signal before determining whether to use diversity. As a result, the receiver of Gustafsson is unsuitable for determining diversity for a signal having a very short duration, such as the QPCH bit of Willey. If the receiver of Gustafsson were used to receive the QPCH bit of Willey, the receiver Gustafsson would not be able to receive and demodulate a portion of the OPCH bit in time to determine whether to use diversity for the OPCH bit.

For at least the reasons given above, Applicants submit that claim 14 is patentable over the applied references, and respectfully request that the rejection of claim 14 be withdrawn.

Independent claims 19, 27, 22, 32, 34, 36 and 39 are also patentable for at least the reasons given above for claim 14.

Claim 22 is patentable for at least the reasons given for claim 14. Claim 22 is additionally patentable for at least the additional reasons given below.

Claim 22 is directed to a method for decoding a quick paging channel (QPCH) in a communication system. The method comprises determining a first data bit of the QPCH received at a receiver, including a plurality of receiver chains for receive diversity, in a mobile station in the communication system. The method further discloses determining receive diversity at the receiver of the mobile station when the determined first data bit is a one or an erasure, wherein the determining the receive diversity includes determining a number of the plurality of receiver chains for receive diversity based on a channel condition of a pilot channel received at the receiver, wherein power consumption of the receiver is controlled based on the receive diversity.

Thus, among its many features, the method of claim 22 includes the feature of determining receive diversity when the determined first data bit of the QPCH is a one or an erasure. None of the applied references, taken alone or in combination, teaches or suggests at least this additional feature of claim 22.

Gustafsson discloses a receiver that determines whether to use diversity based on current radio performance. Nowhere, however, does Gustafsson disclose the receiver determining when to make the diversity determination based on the value of a first data bit of a QPCH. Willey discloses a QPCH paging indicator bit received by a mobile station having three possible values of "ON", "OFF" and "not certain." See col. 5, lines 48-50 and lines 57-61 of Willey. However, neither Willey nor Gustafsson teaches or suggests using the determined value of a first data bit of a QPCH as a basis for determining when to make a receive diversity determination. Neither Willey nor Gustafsson teaches a relationship between when to make a receive diversity determination and the value of a QPCH bit, and therefore provides no rationale for one skilled in the art to use the value of a QPCH bit as a basis for determining when to make a receive diversity determination. Thus, Applicants submit that it would not have been obvious to combine Gustafsson with Willey to arrive at the feature of determining receive diversity when the determined first data bit of the QPCH is a one or an erasure, as recited in claim 22.

Therefore, in addition to being patentable for the reasons given for claim 14, claim 22 is additionally patentable for at least the additional reasons given above.

Independent claims 36 and 30 are also additionally patentable for at least the additional reasons given for claim 22.

Claim 32 is patentable for at least the reasons given for claim 14. Claim 32 is additionally patentable for at least the additional reasons given below.

Claim 32 is directed to a method for decoding a quick paging channel (QPCH) in a communication system. The method comprises determining a first data bit of the QPCH received at a receiver, including a plurality of receiver chains for receive diversity, in a mobile station in the communication system and switching the mobile station to a sleep mode when the determined first data bit is a zero. The method also comprises determining a second bit of the QPCH received at the receiver when the first data bit of the QPCH is either a one or an erasure. The method further comprises determining receive diversity at the receiver of the mobile station when the determined second data bit is an erasure based on a channel condition of pilot channel received at the receiver, and directing the mobile station resources to receive a receive channel when the determined second data bit is a one, wherein power consumption of the receiver is controlled based on the receive diversity.

Thus, among its many features, the method of claim 32 includes the feature of determining receive diversity when the determined second data bit of the QPCH is a one or an erasure. None of the applied references, taken alone or in combination, teaches or suggests at least this additional feature of claim 32.

Gustafsson discloses a receiver that determines whether to use diversity based on current radio performance. Nowhere, however, does Gustafsson disclose the receiver determining when to make the diversity determination based on the value of a second data bit of a QPCH. Willey discloses a QPCH paging indicator bit received by a mobile station having three possible values of "ON", "OFF" and "not certain." See col. 5, lines 48-50 and lines 57-61 of Willey. However, neither Willey nor Gustafsson teaches or suggests using the determined value of a second data bit of a QPCH as a basis for determining when to make a receive diversity determination. Neither Willey nor Gustafsson teaches a relationship between when to make a receive diversity determination and the value of a QPCH bit, and therefore provides no rationale for one skilled in the art to use the value of a QPCH bit as a basis for determining when to make a receive diversity determination. Thus, Applicants submit that it would not have been obvious to combine Gustafsson with Willey to arrive at the feature of determining receive diversity when the determined first data bit of the QPCH is a one or an erasure, as recited in claim 22.

Therefore, in addition to being patentable for the reasons given for claim 14, claim 32 is additionally patentable for at least the additional reasons given above.

Independent claim 34 is also additionally patentable for at least the additional reasons given for claim 32.

At least for these reasons, Applicants respectfully submit that the independent claims are patentable over the applied references. The pending dependent claims inherit the patentability of their respective independent claims and, as a result, also patentably distinguish over the cited references. For at least these reasons, Applicants respectfully request reconsideration and allowance of the claims.

Allowable Subject Matter

Applicants thank the Examiner's indication that claims 5-6 and 11-13 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. However, Applicants maintain that independent claims 1 and 7, from which claim 5-6 and 11-13 depend, respectively, are allowable in their own right. Accordingly, no amendment is necessary at this time.

Applicants thank the Examiner's indication that claims 47 and 48 would be allowable if rewritten to overcome the 35 U.S.C. § 112, second paragraph, and § 101 rejections and to include all of the limitations of the base claim and any intervening claims. Claims 47 and 48, as amended, overcome the § 112, second paragraph, and § 101 rejections, for the reasons discussed above. Applicants thank the Examiner for this indication of allowability, but maintain that independent claims 43, from which claim 47 and 48 depend, is allowable in its own right. Accordingly, no amendment is necessary at this time.

CONCLUSION

In light of the amendments contained herein, Applicants submit that the application is in condition for allowance, for which early action is requested. Should any of the above rejections be maintained, Applicants respectfully request that the noted limitations be identified in the cited references with sufficient specificity to allow Applicants to evaluate the merits of such rejections. In particular, rather than generally citing whole sections or columns, Applicants request that the each claimed element be specifically identified in the prior art to permit evaluating the references.

Please charge any fees or overpayments that may be due with this response to Deposit Account No. 17-0026.

Respectfully submitted,

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